coats of an aneurismal tumour; their number was in the proportion of one to four of the larger globules, and their diameter was $\frac{1}{2800}$ of an inch in the larger in contact with the circulating blood; in the other layers they became more numerous, and in that longest coagulated were in the proportion of four to one.

In the section of an aneurismal tumour, the author notices the uncommon appearance of crystals of sulphate of lime with muriate and phosphate of soda, which, as well as the globules, he supposes to have been originally dissolved in the serum, since they are only brought to view by the act of coagulation.

In coagulable lymph deposited during violent inflammation, the same small globules were observed, mixed with a few colourless blood globules. The globules, stated by the author in a former lecture to have been produced in the serum, are also of a similar nature; and to distinguish them from the larger blood globules, he proposes to call them globules of lymph. In the buff of blood they were very numerous in the upper and firmest part, but the lower and softer layer consisted principally of blood globules.

A tumour in the prostate gland was found Mr. Bauer to contain both kinds of globules, and a considerable proportion of transparent jelly. The hard compact part of a tumour in the breast consisted chiefly of lymph globules and elastic jelly. In its softer part the blood globules predominated, so that the structure of these tumours is nearly allied to that of aneurismal sacs.

In buffy blood the proportion of aëriform matter, evolved under the exhausted receiver of the air-pump, was less than that of healthy blood, and appeared in excess in the blood drawn from the arm of a person an hour after a hearty meal. In the mucus of the pylorus and duodenum Mr. Bauer found lymph and blood globules. In the chyle he found the size of the globules various; those which were very small increased in size whilst under the microscope, and became as large as blood globules enveloped in their colouring matter; they appeared opake and milk white. Mr. Bauer is satisfied, from these observations, that the globules of the blood are perfectly formed in the mesenteric glands, with the exception of colour, which they receive in the vessels of the lungs.

The Bakerian Lecture. On the Composition and Analysis of the Inflammable Gaseous Compounds resulting from the Destructive Distillation of Coal and Oil, with some Remarks on their relative Heating and Illuminating Powers. *By* William Thomas Brande, *Esq. Sec. R.S. Prof. Chem. R. I.* Read November 18, 1819. [*Phil. Trans.* 1820, *p.* 11.]

This paper is divided into two sections: in the first, the author's object is to show that no other compound of carbon and hydrogen can be demonstrated to exist except that usually termed *olefiant gas*, consisting of one proportion of carbon and one of hydrogen; and that the supposed compound of one of carbon and two of hydrogen, gene-

rally called *light hydrocarbonate*, is in reality a mere mixture of hydrogen and olefiant gases. In proof of this opinion he details a series of analytical experiments upon the gases from coal, oil, acetate of potash, moist charcoal, &c., conducted chiefly by detonation with oxygen, by heat alone, and by the action of sulphur at high temperatures, and obtains results analogous to those afforded by mixtures of hydrogen and olefiant gas, of the same specific gravities. Of the gases above-mentioned, however, the specific gravity, combustibility, and intensity of light during combustion, are often much interfered with by the presence of carbonic oxide and carbonic acid.

Of the products obtained by the destructive distillation of coal and oil, Mr. Brande thinks that some are of what may be termed secondary formation; that is, that they result from the mutual action of the first formed gaseous products at high temperatures. Thus a peculiar compound of hydrogen and carbon, volatile and odorous, resembling tar in appearance, but having the characters of resin, is formed by passing pure olefiant gas through a tube of red-hot charcoal; and sulphuret of carbon is formed by the mutual agency of carburetted and sulphuretted hydrogen gases at high temperatures. To the latter compound the author refers the production of sulphurous acid, by the combustion of coal gas in cases where, by the test of acetate of lead, it is shown to be free from sulphuretted hydrogen. In this section of the paper the author further details some processes for the analysis of complex gaseous mixtures, which he thinks afford more accurate results, and are easier of performance than those usually practised, and which are rendered important as elucidating the nature of the gaseous products, now in common use for artificial illumination.

The second section of this lecture contains comparative experiments on the heating and illuminating powers of olefiant, coal, and oil gases, with some incidental remarks on the general properties of radiant matter.

To give the light of ten ordinary wax candles for one hour it required 2600 cubic inches of olefiant gas, 4875 of oil gas, and 13,120 of coal gas. The consumption of oxygen amounts in the first to 7800 cubic inches, in the second to 11,578 cubic inches, and in the third to 21,516; hence it follows that the heating powers of the respective flames being nearly similar, there will necessarily be much more heat produced by coal gas illumination than by an equal illumination of oil gas, and by oil gas more than by olefiant.

The economy of combining several flames for the production of light is strikingly illustrated by comparative experiments upon insulated and combined jets of flame. Thus, in respect to olefiant gas, a single jet, producing the light of one candle, consumes 640 cubic inches per hour; while a burner, with united jets of flame, giving the light of ten single jets, consumes only 2600 cubic inches, instead of the estimated quantity of 6400.

Some comparative experiments upon the effects of solar and terrestrial light conclude this lecture, from which it appears that, al-

though the light of gas flames, concentrated into a very brilliant focus by means of thick plano-convex lenses, produced a very sensible heating power; it does not in the slightest degree blacken the chloride of silver, nor does it influence the combination of chlorine with hydrogen, which is a yet more susceptible test of the direct influence of the solar rays; on the other hand, the brilliant light occasioned by the discharge of the voltaic apparatus, presently blackens the chloride of silver; and when a mixture of chlorine and hydrogen is exposed to its influence, it causes the production of muriatic acid, sometimes quietly and sometimes with explosion, in the manner of the solar rays. The concentrated rays of lunar light neither possess heating powers, nor do they appear to influence chemical combination.

In conclusion the author, after adverting to the inefficiency of Mr. Leslie's photometer, for measuring the intensity of artificial light, suggests an instrument in which the effects are measured by the expansion of the vapour of ether, renewable from a column of that fluid.

On the Elasticity of the Lungs. *By* James Carson, *M.D.* *Communicated by* Thomas Young, *M.D. For. Sec. R.S.* Read Nov. 25, 1819. [*Phil. Trans.* 1820, *p.* 29.]

In a treatise published some years ago on the motion of the blood, the author contended that the influence of the elasticity of the lungs upon that function had been overlooked by physiologists. The object of the present communication is to ascertain the real force of this elastic power, as it exists in the healthy living body. For this purpose Dr. Carson connected with the trachea of several animals a glass syphon, so placed as to admit of pressure being exerted upon the lungs by a column of water contained in it; an opening was made into the cavity of the chest on both sides, and the height of the column of water in the tube was considered as equivalent to the pressure exerted upon it by the elastic power of the lungs of an ox: the author thinks it clearly ascertained "that the spring of air compressed by a column of water, of a foot and a half high, is not equal to the rebounding spring of the lungs at the usual stage of their dilatation." The only experiment, however, which gave, in the author's opinion, conclusive results, was made upon a dog; for in all the others the gradual sinking of the water to its ordinary level in the syphon indicated some wound in the lungs. In the present case the height of the column of water supported in the tube was ten inches.

Dr. Carson concludes this paper with some observations on the modes of effecting artificial respiration, and on the method of ascertaining the actual quantity of air existing in the lungs after complete expiration.